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(54) **A transport and support means for heavy, high temperature articles and its manufacturing process**

Gegenstand zum Tragen und Transport schwerer Hochtemperaturgegenstände und Verfahren zur Herstellung

Moyen de support et de transport pour des articles lourds à haute température et son procédé de fabrication

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**EP-A- 0 375 369                      GB-A- 2 057 966  
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US-A- 4 798 760                    US-A- 5 110 672**

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## Description

[0001] The herein invention pertains to a transport and support means for heavy, high-temperature articles and to its manufacturing process.

[0002] In particular, the herein invention refers to a transport and support means for heavy, high-temperature articles which is particularly adapted for use on cooling benches, in extrusion moulding plants or in the casting of nonferrous materials such as aluminium, glass, etc., in the heat treatment process of glass, ceramics, etc. or in the transport of hot silica sand for the "shell moulding" process in the electrometallurgical industry, as well as in the heat printing process of textiles or other materials.

[0003] The term "transport and support means" as used in the description and in the Patent Claim includes the loop belts used to transport extruded aluminium products from the extruder head or moulded glass from the mould, as well as to transport the aforementioned through the various production or working processes, to transport hot silica sand and to transport and support textiles and other materials in the heat printing processes, as well as pads, tubes and/or rollers as used on extruding benches or as spacers in the production of extruded aluminium products and in the heat-treatment process in the ceramic industry.

[0004] As is widely known, hot aluminium bars, on coming out of the press extruder head, are collected on a number of benches which then transport the extruded items through the various production stages, such as cooling, stretching, etc., at right angles to the extruding direction. While the extruded product is transported away from the extruding head and transferred from one process stage to another the product gradually cools down from a typical initial temperature of approximately 550-600°C.

[0005] Each bench includes: two rollers, of which one is a drive roller, a support plate positioned between the two rollers and a conveyor belt placed around the rollers and plate which supports the extruded product.

[0006] Given its role, there are many characteristics required of this belt some of which include: high temperature resistance, low heat transfer, high density to transport heavy and high-temperature products, good tracking, smooth surfaces so as not to cause pits or scratches on the surface of the hot extruded product, adequate friction coefficient as to avoid slipping on the pulleys, dimensional stability under the combined action of heat and pressure, reduced hygroscopic properties, slower cooling times at working temperatures, no released gas during heat decomposition, reduced or zero elongation to avoid slipping on the driven pulleys, etc.

[0007] The various kinds of technical, textile materials used or proposed for such uses do not give the aforementioned required characteristics. For example, we know of belts consisting of various overlaid layers of fabrics made of heat resistant fibres, generally aromatic polyamide fibres (aramidics) such as Kevlar®, which are

then sewn together and whose ends are joined to form a loop. EP-A-0 375 369 discloses a blanket, suitable to be used in laminating, fusing, calendering or transfer printing, comprising a flat-woven structure of duplex form consisting of polyether-ether-ketone monofilament yarns in both warp and weft directions and having a silicone rubber coating at the support surface thereof. These belts have a number of drawbacks which limit their uses and life. For example, they fray since the fabric fibres are cut by the sharp edges of the extruded bars. This fraying, in turn, damages the extruded bars owing to the rough fabric surface and the sewn seam.

[0008] The belts undergo high elongation thus causing sagging and side movement during running so that they will override the guide plates.

[0009] We also know of belts which consist of a support base or element made of one or more ply of polyester fabric. A cushion pad of non-woven fabric made of heat-resistant fibres is then glued onto the support. These belts are made tubular (endless) by sewing together both the support ends and the ends of the cushion pad.

[0010] These belts allow one to solve some of the drawbacks pertaining to purely fabric belts, for example, fraying and rough fabrics, but they still have a seam which consequently damages the transported product, they sag, elongate and curl up at the edges thus causing side movement and imperfect belt running on the transport rollers and support plate.

[0011] We also know conveyor belts which are made of a flexible fabric base made of fibres with a heat resistance of at least 150°C and a layer or veil of heat-resistant fibre quilted or needled to at least one surface of the support fabric. The flexible base fabric and the fibre layer form a single body with the fibre layer on one side and the fabric base on the other side.

[0012] The base fabric side is preferably impregnated and covered with a heat resistant resin so as to increase the friction coefficient between the transport rollers and the conveyor belt. The fabric base is weft woven using heat resistant fibre threads, such as the polyparaphenyleneperephthalamide fibre, known on the market under the trade name Kevlar®, and warp woven using polyester fibres.

[0013] US-A-4 604 310 discloses a seamless endless belt for battery pasting machines consisting of an outer layer, formed by between 1 and 3 plies of an endless woven fabric, and an inner backing layer formed by multi-strata of non-woven webs of synthetic staple fibres and light woven meshes, the outer layer and the inner backing layer are bound together by needling.

[0014] However, even these belts have their drawbacks. For example, owing to their low transversal rigidity, at right angles to the running direction, when transporting hot bars these belts tend to slide out of their running grooves and override the sides of the support plates they are running on. During the cooling stage, in fact, the extruded and thermoformed bars retract greatly

and this retraction pushes the belts sideways towards the sides of the support plate. The belts curl up at the edges, slide out of their running grooves and override the production plates. This drawback is also due to these belts elongating.

[0015] The object of the herein invention is to eliminate the above drawbacks.

[0016] More particularly, the object of the herein invention is to achieve a conveyor belt which is adapt to the aforementioned uses and which, apart from having the aforementioned characteristics of heat resistance, smooth surfaces, adequate friction coefficient, flexibility, has a high resistance and rigidity at right angles to the running direction so that it does not curl up owing to the pushing effect of the cooling, retracting material being transported.

[0017] According to the present invention, this and other objects are achieved by a transport and support means for heavy high temperature articles comprising:

a) a flexible support base consisting of either

- a1) a single woven fabric (1), or
- a2) a plurality of woven fabrics (1) alternating and overlaid with synthetic staple-fibre veils (4), said overlaid fabrics (1) and veils (4) needled together, and

b) a veil (4') of synthetic staple heat resistant fibres needled to at least one surface of said flexible support base; each woven fabric (1) comprising one or more plies (1a, 1b, 1c), each ply formed from fibres having a heat resistance of at least 150°C and said flexible support base having been treated with a silicone rubber or with a heat-resistant resin and then vulcanised; wherein each ply (1a, 1b, 1c) is made of weft woven synthetic rigid monofilaments having a diameter from 0.1 to 1.00 mm and of warp woven parallel, twisted or braided synthetic multifilaments (1d).

[0018] The support base may be made of either a single wefts woven fabric, one or more ply, using rigid, synthetic monofilaments with a diameter between 0.1 and 1.0 mm and warp woven using parallel, twisted or braided synthetic multifilaments or, preferably, made of a number of fabrics, one or more ply, as aforementioned, overlaid and alternating with synthetic, staple-fibre veils, all needled together.

[0019] Any synthetic monofilament on the market with a heat resistance of above 150°C may be used for the wefts weave to produce the support fabric.

[0020] Examples of synthetic monofilaments include the polyesters such as polyethylenterephthalate (PET), preferably high strength polyether ether ketone (PEEK) and the polyamides. These products, in general, have a strength of at least 40.50 g/tex (4.5 g/den) and an elongation at break of 5-20%.

[0021] The multifilaments should preferably be made of continuous staple automatic polyamides, known on the market under the trade names CONEX®, NOMEX®, KEVLAR®, TWARON®, used alone or bound together.

5 [0022] The support base may be a one or more ply seamless endless fabric or it may be an open-ended.

[0023] The number of monofilaments in the weft and multifilaments in the warp is not critical and may vary within a wide range based on the required mechanical resistance. Preferably, the number of monofilaments will be between 5 and 20 per centimetre, based on the diameter of each fibre; the number of multifilaments (110 - 220 tex - 1,000 - 2,000 den) may vary between 10 and 30 per centimetres. In general, it is preferable for the supporting fabric not to be very compact so as to aid penetration of the veil (batt) fibres through the fabric weave during the needling process.

[0024] The number of fabric ply is not critical and depends on the required right angle rigidity. This generally varies between 1 and 5.

20 [0025] The synthetic, staple, heat-resistant fibres used to make the veil include both the aromatic polyamides, which are known under the trade name CONEX®, NOMEX®, KEVLAR®, TWARON®, and the polybenzimidazoles (PBI) made by the U.S. firm Celanese.

[0026] The transport and support means may be thermostabilised by pressurised heat treatment up to 1966 N/cm (200 kg/cm) at a temperature of between 150°C and the maximum allowable temperature for the least heat resistant fibres.

30 [0027] Furthermore, the aforementioned transport and support means may be compacted in a steam or oil operated press heated to a temperature of 150 to 260°C at a pressure of between 500 and 5000 Kpa (5 and 50 kg/cm<sup>2</sup>.) Finally, the transport and support means may be surface ground to obtain a smooth surface and even thickness.

[0028] The manufacturing characteristics, the properties and the advantages pertaining to the herein "transport and support means" invention may be better understood from the following detailed description which refers to the attached diagrams which, in turn, represent an example of how to achieve the herein invention, a method which is preferable but not limited to the herein invention. The diagrams include:

Fig. 1 illustrates a schematic side view of a single ply support fabric;

Fig. 2 illustrates a perspective view of the fabric in Fig. 1;

Fig. 3 illustrates a schematic side view of a two ply support fabric;

Fig. 4 illustrates a schematic side view of a three ply support fabric;

Fig. 5 illustrates a schematic view of the needling process of a staple-fibre veil to a fabric, thus forming a support base made of overlaid, alternating layers of fabric and fibre veils needled together;

Fig. 6 illustrates a schematic side view of part of the belts pertaining to the herein invention;

Fig. 7 illustrates a schematic side view of the completed belts pertaining to the herein invention;

Fig. 8 illustrates a schematic side view of the belt thermostabilising device; and

Fig. 9 illustrates a schematic side view of a belt pressing and compacting device.

[0029] The herein invention shall hereinafter be described with particular reference to the manufacture of a seamless, continuous conveyor belt. The same procedure may be applied for the manufacture of pads, rollers, tubes, etc.

[0030] With reference to the diagrams, the flexible support base for the conveyor belt pertaining to the herein invention may be made of at least one weft woven fabric (1), one or more ply (1a, 1b, 1c), using rigid, synthetic monofilaments with a diameter between 0.1 and 1.0 mm and warp woven using multifilaments (1d). This fabric (1) is manufactured on a shuttle loom in both the endless and open-ended versions. The fabric (1) may be used as such for the support base or, preferably, it may be used by overlaying and alternating layers of the fabric (1) with staple-fibre veils (4). Preferably, there should be from 2 to 4 overlaid layers. Fig. 7 illustrates a support base made of two layers of fabric (1) and two layers of staple-fibre veil (4).

[0031] The support base, made of alternating, overlaid layers of fabric (1) and staple-fibre veils (4), is achieved by feeding the fabric (1) from a roll (6) onto the stretching rollers (2a, 2b, 2c) and laying the staple-fibre veil (4) from a lapping machine (3) onto the fabric (1). The rollers should be set at the distance required from the to the other to obtain the belt circumference required.

[0032] The fabric (1) and the staple-fibre veil (4) are wrapped around the rollers (2a, 2b, 2c) once or twice based on the mechanical resistance required, generally from 1 to 5 windings, preferably from 2 to 4. The starting wrapping edge shall not coincide with the end edge but shall overlap it by 5 to 10 cm, to ensure the greatest belt tensile strength. Any possible excess thickness owing to the overlapping may be eliminated by successive grinding treatment on the finished belt.

[0033] The alternating, overlaid layers of fabric (1) and fibre veils (4) are then needled together using barbed needles in a process which is generally known as needling. To this aim, the overlaid layers of fabric (1) and fibre veil (4) are repeatedly fed under the needles of a needling machine.

[0034] This machine consists of a support plate (7) and a needle head plate (8) with vertical movement. The barbed needles penetrate right through the fabric veil layer, hook the fibres and pull them through or partially through the veil (4) and the fabric (1) thus creating interwoven and interbound points or areas of fibres which are bound to the fabric (1).

[0035] The support base thus achieved, made of the fabric (1) or the bound multi-layer, fabric-fibre veil, is then impregnated with silicon rubber or heat-resistant resin, so as to obtain a heat protection or insulating barrier to the monofilaments and to the multifilaments.

[0036] Impregnation is performed by immersion or by spreading. The thickness of the silicon rubber or the resin may be between 0.1 and 3 mm. One may use both silicon rubber which vulcanise at room temperature or those that vulcanise at high temperature.

[0037] Examples of known silicone rubber products on the market are ELASTOSIL® E 50 and E 70 produced and sold by Wacker Chemie and type 3-7044 TEXTILE RTV®, produced and sold by Dow Corning.

After impregnation, the rubber or resin is vulcanised. [0038] After impregnation or vulcanisation, the belt is placed onto the stretching rollers (2a, 2b, 2c) and a further synthetic staple-fibre veil (4') is fed onto the exposed surface. Preferably, more than one carded veil, overlaid and crossed (4') shall be fed onto the belt.

[0039] The staple-fibre veil or veils (4') are consolidated by a further needling process so as to create a felt structure, completely bound to the support base and covered or impregnated with silicon rubber or resin.

[0040] The compactness and density of the fibre veil (4') depends on the number of needle strokes or runs through the bound material. The number of strokes generally varies between 800 and 3000 per cm<sup>2</sup>. The insulation offered by the fibre veil (4') increases with their compactness or density and thus by the number of strokes per square centimetre.

[0041] Once the needling treatment has been completed, the needled belt (5), made of layers of fabric (1), the interlining veils (4) and the needled, compacted surface veil (4') is then removed from the stretching rollers (2a, 2b, 2c) and thermostabilised under tension. Thermostabilisation may be performed on calendars fitted with diathermic oil heated cylinders (9) or by infrared panels (10). The treatment temperature should be at least 150°C and up to the highest bearable temperature of the monofilaments or by the belts fibres; the tension may reach 1966 N/cm (200 kg/cm). This thermofixing treatment eliminates any possible belt elongation or deformation under working conditions. Thermofixing is generally performed at a higher tension than the belt is exerted to under working conditions.

[0042] The thermofixed belt (5) successively undergoes press compacting treatment in a heated plate press (11). The compacting treatment is performed by running the belt (5), on rollers (12), through the press pressure plates (11) at set length at a time. The pressure plate temperature is set between 150 and 260°C and the pressing pressure may vary between 500 and 5000 Kpa (5 and 50 kg/cm<sup>2</sup>).

[0043] This compacting treatment allows for an increase in the belt (6) density of 15 to 30% and, particularly, the compacted needled surface layer (4') thus increases the insulating protection that the layer offers the

support fabric.

[0044] Furthermore, the increase in belt density reduces wear on the working surface, improves belt resistance to cuts and abrasions caused by the sharp edges of bars and maintains belt thickness longer, thus stopping the bars from rubbing against the sides of the support plate owing to a reduction in belt thickness.

[0045] The belt density may be further increased by applying, before the compacting treatment, a resin, cross-linking agent or heat-resistant fixer, for example the silicon resin emulsion SILRES MP® 42 E as produced and sold by Wacker Chemie.

[0046] A final grinding treatment will eliminate any overlapping thickness and make the surface smoother.

[0047] The belts can be manufactured to the width required or, preferably, for economical reasons, they may be manufactured to the maximum width allowed by the needling machine, spreading machine, thermostabilising and pressing machine and then cut to the required width. The pads can be produced by cutting the belts.

[0048] The edges of the belts or pads may be, if required, heat welded or resin coated to avoid fraying.

[0049] Though the herein invention has been hereabove described with reference to one of the possible uses, the transport and support means pertaining to the herein invention may have numerous other potential applications; for example, to transport ceramic and glass products as well as other high temperature products such as silica sand in the electrometallurgy industry, or the fabric transfer-printing process.

## Claims

1. A transport and support means for heavy high temperature articles comprising:

a) a flexible support base consisting of either  
a1) a single woven fabric (1) or a2) a plurality of woven fabrics (1) alternating and overlaid with synthetic staple-fibre veils (4), said overlaid fabrics (1) and veils (4) needled together and

b) a veil (4') of synthetic staple heat resistant fibres needled to at least one surface of said flexible support base,

wherein each woven fabric (1) comprises one or more plies (1a, 1b, 1c), each ply formed from fibres having a heat resistance of at least 150°C and said flexible support base has been treated with a silicone rubber or with a heat-resistant resin and then vulcanized, characterized in that each ply (1a, 1b, 1c) is made of weft woven synthetic rigid monofilaments having a diameter from 0.1 to 1.0 mm and of warp woven parallel, twisted or braided synthetic multifilaments (1d).

2. The transport and support means according to claim 1, wherein the number of plies making up the fabric (1) is between 1 and 5.

3. The transport and support means according to claim 2, wherein the number of plies making up the fabric (1) is between 2 and 4.

4. The transport and support means according to anyone of the preceding claims, wherein the synthetic monofilament has a heat resistance of at least 150°C and it is selected from polyester, polyether ether ketone (PEEK) and polyamide monofilaments having a strength of at least 40.50 g/tex (4.5 g/den) and an elongation at break between 5% and 20%.

5. The transport and support means according to anyone of the preceding claims, wherein the synthetic multifilament is made of aromatic polyamide and has a count of between 110 and 220 tex (1,000 and 2,000 den).

6. The transport and support means according to anyone of the preceding claims, wherein the number of weft woven monofilaments is from 5 to 20 per cm and the number of warp woven multifilaments is from 10 to 30 per cm.

7. The transport and support means according to anyone of the preceding claims, wherein the staple synthetic fibres are selected from aromatic polyamide and polybenzimidazole fibres.

8. The transport and support means according to anyone of the preceding claims, wherein the thickness of the silicone rubber or resin is between 0.1 and 3 mm.

9. The transport and support means according to anyone of the preceding claims, thermostabilized under tension with a load up to 1966 N/cm (200 Kg/cm) and at a temperature between 150°C and the maximum temperature allowed by the constituting fibre having the lowest heat resistance.

10. The transport and support means according to anyone of the preceding claims, compacted in a press heated to a temperature of 150 to 260°C and at a pressure of between 500 and 5000 Kpa (between 5 and 50 Kg/cm<sup>2</sup>).

11. The use of the transport and support means according to anyone of the preceding claims as a seamless, continuous loop belt for transporting extruded aluminium products from an extrusion press head.

**Patentansprüche**

1. Transport- und Tragevorrichtung für schwere Gegenstände hoher Temperatur, umfassend:

a) eine flexible Trägerbasis bestehend aus entweder

a1) einem einfach gewebten Textilerzeugnis (1) oder

a2) einer Vielzahl von gewebten Textilerzeugnissen (1), die sich mit synthetischen Stapelfaserdecklagen (4) abwechseln und mit diesen überdeckt sind, wobei die überdeckten Textilerzeugnisse (1) und Decklagen (4) miteinander vernadelt sind, und

b) eine Decklage (4') aus synthetischen hitzebeständigen Stapelfasern, die an mindestens eine Oberfläche der flexiblen Trägerbasis genadelt sind,

wobei jedes gewebte Textilerzeugnis (1) ein oder mehrere Schichten (1a, 1b, 1c) umfaßt, wobei jede Schicht aus Fasern mit einer Hitzebeständigkeit von mindestens 150 ° C gebildet ist und die flexible Trägerbasis mit einem Silikongummi oder mit einem hitzebeständigen Kunststoff behandelt und dann vulkanisiert wurde, dadurch gekennzeichnet, daß jede Schicht (1a, 1b, 1c) aus schußgewebten synthetischen, festen Monofilamenten mit einem Durchmesser von 0,1 bis 1,0 mm und aus kettgewebten parallelen, gezwirnten oder geflochtenen, synthetischen Multifilamenten (1d) hergestellt ist.

2. Transport- und Tragevorrichtung nach Anspruch 1, wobei die Anzahl von Schichten, die das Textilerzeugnis (1) bilden, zwischen 1 und 5 ist.

3. Transport- und Tragevorrichtung nach Anspruch 2, wobei die Anzahl von Schichten, die das Textilerzeugnis (1) bilden, zwischen 2 und 4 ist.

4. Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche, wobei das synthetische Monofilament eine Hitzebeständigkeit von mindestens 150° C hat und aus Polyester-, Polyetheretherketon (PEEK)- und Polyamidmonofilamenten mit einer Festigkeit von mindestens 40,50 g/tex (4,5 g/den) und einer Bruchdehnung zwischen 5 % und 20 % ausgewählt ist.

5. Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche, wobei das synthetische Multifilament aus aromatischem Polyamid hergestellt ist und eine Feinheitnummer zwischen

110 und 220 tex (1.000 und 2.000 den) hat.

6. Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche, wobei die Anzahl von schußgewebten Monofilamenten von 5 bis 20 pro cm und die Anzahl von kettgewebten Multifilamenten von 10 bis 30 pro cm ist.

7. Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche, wobei die synthetischen Stapelfasern aus aromatischen Polyamid- und Polybenzimidazolfasern ausgewählt sind.

8. Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche, wobei die Dicke des Silikongummis oder Kunststoffs zwischen 0,1 und 3 mm ist.

9. Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche, die unter Spannung mit einer Last von bis zu 1.966 N/cm (200 Kg/cm) und bei einer Temperatur zwischen 150° C und der maximal erlaubten Temperatur der bildenden Faser mit der kleinsten Wärmebeständigkeit thermostabilisiert ist.

10. Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche, die in einer Presse, welche auf eine Temperatur von 150 bis 260° C erhitzt ist, bei einem Druck von zwischen 500 und 5.000 Kpa (zwischen 5 und 50 Kg/cm<sup>2</sup>) verdichtet ist.

11. Verwendung der Transport- und Tragevorrichtung nach einem der vorhergehenden Ansprüche als ein nahtloser kontinuierlicher Schleifengurt zum Transport von extrudierten Aluminiumprodukten von einem Extrusionspreßkopf.

**Revendications**

1. Moyens de transport et de support pour articles lourds à haute température, comportant :

a) une base flexible de support constituée soit a1) d'une étoffe tissée unique (1), soit a2) de plusieurs étoffes tissées (1) en alternance et en recouvrement avec des voiles (4) de fibres synthétiques discontinues, lesdites étoffes (1) et lesdits voiles (4) en recouvrement étant cousus ensemble, et

b) un voile (4') de fibres synthétiques discontinues résistant à la chaleur, cousu à au moins une surface de ladite base de support flexible,

dans lesquels chaque étoffe tissée (1) comporte une ou plusieurs couches (1a, 1b, 1c), chaque

- couche étant formée de fibres ayant une résistance à la chaleur d'au moins 150°C, et ladite base de support flexible a été traitée avec un caoutchouc de silicone ou avec une résine résistant à la chaleur, puis vulcanisée, caractérisé en ce que chaque couche (1a, 1b, 1c) est formée de monofilaments synthétiques rigides tissés de trame ayant un diamètre de 0,1 à 1,0 mm et de multifilaments synthétiques torsadés ou tressés (1d), parallèles, tissés de chaîne.
2. Moyens de transport et de support selon la revendication 1, dans lesquels le nombre de couches constituant l'étoffe (1) est compris entre 1 et 5.
  3. Moyens de transport et de support selon la revendication 2, dans lesquels le nombre de couches constituant l'étoffe (1) est compris entre 2 et 4.
  4. Moyens de transport et de support selon l'une quelconque des revendications précédentes, dans lesquels le monofilament synthétique présente une résistance à la chaleur d'au moins 150°C et est choisi parmi des monofilaments de polyester, de polyéther-éthercétone (PEEK) et de polyamide ayant une résistance d'au moins 40,50 g/tex (4,5 g/den) et un allongement à la rupture compris entre 5 % et 20 %.
  5. Moyens de transport et de support selon l'une quelconque des revendications précédentes, dans lesquels le multifilament synthétique est formé d'un polyamide aromatique et possède un titre compris entre 110 et 220 tex (1000 et 2000 den).
  6. Moyens de transport et de support selon l'une quelconque des revendications précédentes, dans lesquels le nombre de monofilaments tissés de trame est de 5 à 20 par cm et le nombre de multifilaments tissés de chaîne est de 10 à 30 par cm.
  7. Moyens de transport et de support selon l'une quelconque des revendications précédentes, dans lesquels les fibres synthétiques discontinues sont choisies parmi des fibres de polyamide aromatiques et de polybenzimidazole.
  8. Moyens de transport et de support selon l'une quelconque des revendications précédentes, dans lesquels l'épaisseur du caoutchouc de silicone ou de la résine est comprise entre 0,1 et 3 mm.
  9. Moyens de transport et de support selon l'une quelconque des revendications précédentes, thermos-  
tabilisés sous traction avec une charge s'élevant jusqu'à 1966 N/cm (200 kg/cm) et à une température comprise entre 150°C et la température maximale admise par la fibre constitutive ayant la résis-
- tance à la chaleur la plus basse.
10. Moyens de transport et de support selon l'une quelconque des revendications précédentes, compactés dans une presse chauffée à une température de 150 à 260°C et sous une pression comprise entre 500 et 5000 kPa (entre 5 et 50 kg/cm<sup>2</sup>).
  11. Utilisation des moyens de transport et de support selon l'une quelconque des revendications précédentes en tant que bande en boucle continue, sans joint, pour le transport de produits d'aluminium extrudés à partir d'une tête de presse d'extrusion.

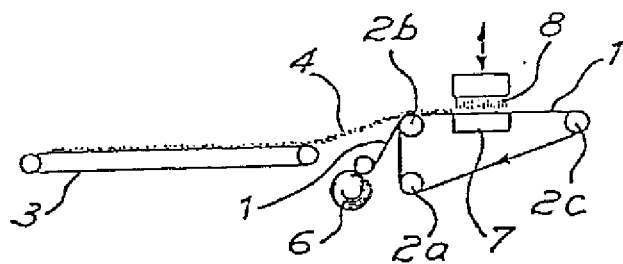
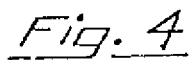
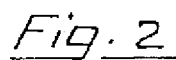


Fig. 5

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Fig. 6

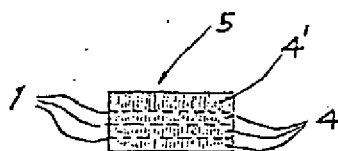


Fig. 7

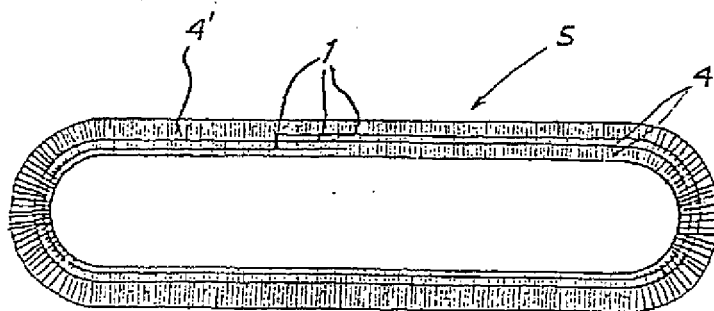


Fig. 8

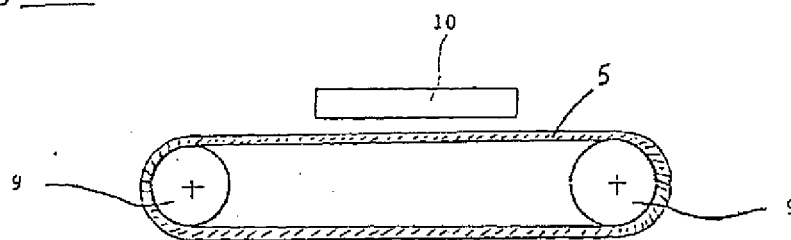


Fig. 9

